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AUTHOR Koster, Fran
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ABSTRACT

The document reviews recent literature on warning processes, evaluates the effectiveness of warnings in changing public policy and personal behavior, and applies warning literature to specific problem areas. Warning is interpreted to include a statement of the problem and a proposed course of action. The document is presented in six parts. Part one identifies the three major groups for which warning literature has been reviewed: (1) shortages of basic supplies, including food and fuel; (2) calamities and accidents related to toxins, chemicals, and radioactivity; and (3) failure of society to provide basic services. Part two presents case studies of responses to air raid alarms, floods, alcohol abuse, and panic by public officials. Responses to warning differed according to the extent to which the event was unfamiliar, sudden, unexpected, and localized. Part three outlines a strategy for effective warnings. Part four lists 44 findings from warning literature, and presents two disaster scenarios. Part five forecasts circumstances which will probably require warnings in the future. These include diminishing oil supplies, water shortages, nuclear explosion, petroleum-related accidents, insecticide poisoning, and the collapse of the social security system. Part six suggests that futurists should concentrate on educating leaders in urban areas on matters related to toxic and nuclear plants and on centralizing collection and analysis of forecasts pertaining to stressful circumstances. (Author/DB)

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WHY PEOPLE DON'T LISTEN TO WARNINGS

With Discussion of Implications for Futurists

Fran Koster
April 3, 1978
Univ. of Mass.
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"History is by and large a record of what people did and not a record of what they failed to do."

E. H. Carr (1961)
What is History

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INTRODUCTION

The developed nations of the world are facing serious threat to their social fabric. A fragile complex set of systems totally inter-dependent, they are faced with shortages in key ingredients to their economies, expotentially growing claims on their future resources, and a growing sense, in some pockets at least, that a crisis of crises is imminent. Among the most evolved and inter-dependent cultures (technologically and socially) is North America. A case could be made that public policy makers in the United States are, in the next 20 years, going to have to confront the most bewildering array of inter-related problems ever faced by such officials in peacetime in our history. They fall into three groups.

1. Those having to do with shortages in basic supplies, such as food and fuel. These shortages are going to have "hard" impacts (people will die) and "soft" impacts (economies will flounder).

2. Calamities and accidents, old in nature, new in size and impact. These events could involve new and awe-somely potent chemicals, persistent toxins, radio-activity, and related dreadfulness. Yet, because most people can grasp an "accident" this category will probably be accepted into the reality base with relative ease. Possessing certain "hard" impacts, "soft" impacts will be localized to a geographic area, and the offending industry.

3. Failure of the society to provide basic services, leading to social decay, collapse of social fabric, and erosion of the authority of the governance system.

How can futurists help our society cope with these emerging issues? One way would be to cause a maximization of the process of getting prepared. We could be good warners.

This paper is about warnings and their effectiveness. After reviewing the literature on warnings and the warning process, the paper attempts to look ahead at America's future, identify some problems about which there is some statistical or intuitive probability of occurrence, and apply the survey of the literature on warnings to the identified areas.

The odds favoring the occurrence of an increasing rate of catastrophic events in the United States seem to be rising, due to two trends. First, there are more of us, living on more land, increasing the odds of a random act of nature lighting upon inhabited ground. Second, as the complexity of man's affairs increases, and the chemical and biological potions we manufacture and use grow more deadly and widespread, the chances of accident increase, and as in the first case, the chances of human beings effected increases. Indeed, this seems to be true in our recent history.

From the period of 1953 to 1970, the various Presidents of the United States made more than 250 major disaster declarations.[1]

> Disaster means the impinging upon a structured community of an external force capable of destroying human life or its resources for survival, on a scale wide enough to excite public alarm, to disrupt normal patterns of behavior, and to impair or overload any of the central services necessary to the conduct of normal affairs or to the conduct of normal affairs or

[1] Russell R. Dynes, *Organized Behavior in Disaster*, Heath & Company, 1971.

> to the prevention or alleviation of suffering and loss. Usually, the term disaster refers to an episode with tragic consequences to a substantial portion of the population.[2]

For each of these 250 disasters, there was a period of warning. Due to increasing use of mass communication devices, the efficiency of gathering and transmitting warning data has increased from the days before satellite weather surveillance, two-way radio, and television. However, there is little way of knowing if the increase in efficiency brought about by this hardware has been matched by an increase in effectiveness.

In the software of the warning process, was Paul Revere effective as a warning agent? Compared to what? Would his voice coming over CON L RAD move us to arms? Why? What should his message contain, and how should it be delivered? Was he guilty of irresponsible behavior?

These are the kinds of questions I was seeking answers to in doing the research for this paper.

The literature on the warning process is not extensive. Much of the solid field work has been done in conjunction with calamities impacting on large groups of people. Accordingly, a significant portion of the examples cited are drawn from the literature of the sociology of disaster and natural hazards. A bias may have thus crept into the analysis, based on this data base. In particular, the examples often describe crowd behavior, rather than individual behavior.

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[2]John Walker Powell, *An Introduction to the National History of Disaster*, Unpublished report, The Psychiatric Institute, Univ. of Maryland, 195?, pp. 8.

Three points need emphasis:

1. Little attention in the warning literature has been paid to accidental calamities (such as toxic gas leaks covering square miles), as opposed to natural calamities (hurricanes), or deliberate calamities (a bomb attack).

   This may have rather serious implications—as you will see, a warning recipient tends to weigh the warning on a scale of probability grounded in their world view. If a warning is received which cannot fit into the recipient's world view, then a serious delay occurs before evasive behavior occurs. I view the omission of data on this sub-category of warning as serious for reasons which will become apparent as the paper is read.

2. None of the work I reviewed dealt with "soft" calamities—collapse of social systems, or famines, for example. A useful description of the literature might be that it concentrated primarily on violence—I found nothing on longer term, or subtle catastrophies. Since I personally feel that the most serious problems facing mankind are "soft" in nature (social disorder, long-term environmental, etc.), I again have regrets about the completeness of the available literature.

3. The traditional definition of a disaster is "an event, concentrated in time and space, in which a society, or a relatively self-sufficient sub-division of a society, undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential functions of the society are prevented.[3]

Many of the examples used in this paper are examples of warnings issued for disasters fitting the above description. Yet, I try to apply the results of this analysis to a series of potential circumstances which, while possessing catastrophic potential, may not be "concentrated in time and space." (An

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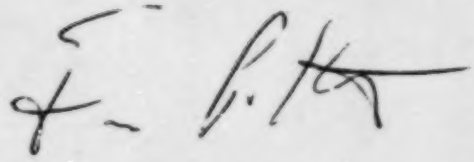
[3]C. E. Fritz, *Disaster*, R. K. Merton and R. A. Nisbet (Eds.), Harcourt, Brace, & World, 1961, p. 655.

example of such a catastrophy might be the slow and irreversable death of the oceans.) Nevertheless, I believe that the models of the warning procedures cited provide a useful format to follow in disseminating the warnings about this new, as yet unactualized set of problems.

In preparing this paper, I made use of computerized literature searchers, going through the Eric Index, the Psychology Abstracts, and the Sociology Abstracts. I found remarkably little. It should be mentioned that most of these computerized data bases go back only to about 1963, and I now have a strong impression that much of the good work on warnings was financed by Civil Defense, during the Cold War, some years earlier.

I intend, in subsequent versions, to go back farther in the literature. I have obtained and read most of the publications produced by the four major national disaster research agencies, and I did extensive other reading. During this process I was greatly aided by the presence of my Committee, especially the patience and tenacity of Dr. Sylvia Forman, without whose help this paper would never have been finished. My gratitude to Dr. Wolf for his support, and to Dr. Peter Wagshal, for providing the model of what a good educator should be. My respect to you, sir. And to Duane Dale, my fellow student, and good friend, whom I love and admire and want to be more like, thank you.

Reluctant though I am to admit it, I have not yet learned all the above individuals have to teach, and so must acknowledge responsibility for the shortcomings in this paper.



A REVIEW OF THE WARNING LITERATURE

The Warning

Throughout the literature on warnings, the word "warning" is generally used to describe a wide range of activities, making it mandatory to carefully read the materials for the implied definition. In this paper, "warning" will be distinguished from "alert." An alert will mean such activities as sounding a siren—blowing an air raid horn, etc. A warning has two components—a statement of the problem, and a proposed course of coping behavior. Following the issuance of the warning, one enters a period of threat, during which a variety of decisions must be made.

These stages are part of an overall sequence of events:

0.	Predisaster Conditions	Determining, to some degree, the effect of and response to impact.
1.	Warning	Precautionary activity.
2.	Threat	Survival action.
3.	Impact	"Holding on."
4.	Inventory	Diagnosis of situation and decision on action.
5.	Rescue	Spontaneous, local, unorganized extrication and first aid; some preventive measures.
6.	Remedy	Organized and professional relief, medical care, preventive and security measures.

7. Recovery — Individual rehabilitation and readjustment; community restoration of property and organizational preventive measures against recurrence.[4]

Dimensions of Disaster Agents

The number of variables which can be combined to describe a sisaster is significant. Each affects the nature of the warning process.

1. Rate: frequency of occurrence
   a. has never happened before
   b. has happened before
2. Physical characteristics
   a. wind, rain, etc. (climatic)
   b. heat (fire), cold (weather)
   c. silent
3. Speed of onset
   a. rapid—avalanche, explosion
   b. gradual—some floods, famine, drought
   c. repetitive—some earthquakes
4. Length of forewarning (difference from onset)
   a. short—bomb attack, explosion
   b. medium—spring flooding, predicted based on winter snows
   c. long—pollution buildup in food chain
5. Duration
   a. short—explosion, etc.
   b. medium—flood, some pollution
   c. long—famine, pollution

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[4] John Walker Powell, *An Introduction to the Natural History of Disaster*, University of Maryland Disaster Research Project, June 30, 1954, pp. 5 as quoted in *Organized Behavior in Disaster*, Dynes, Ohio Staff, 1971.

6. Scope of impact

   a. one house, neighborhood
   b. town, stadium
   c. bio-region, nation

7. Destructive potential

   a. high property damage, low life-risk—(fire slow in spreading)
   b. high life-risk, no property loss (chemical leak, air pollution, radioactivity)
   c. variable—epicenter both a+b

8. Gross predictability

   a. danger area can be predicted with some accuracy but not necessarily with a lot of time of forewarning (e.g., floods, hurricanes, "downwind" accidents like chemical releases)
   b. no predictability—no forewarning (terrorism, auto accidents, "freak accidents")
   c. some forewarning, but no predictability (tornados, disease spread)

9. Gross controllability (varies with speed of onset, nature, amount of warning, all of above)[5]

These variables have obvious implications for the composers of warnings. First, the warner may not know with any accuracy some or all of the above dimensions. (Will the disease bring death, or just pain? How large an area will it affect? How fast will it spread? Will propholaxis help? How long will it hand around? In sum: what should the typical citizen do?) Without answers anxiety results.

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[5]List of characteristics is drawn in abridged form from *The Warning System in Disaster Situations*. Disaster Research Center Report No. 9. Ben McLuckie, Ohio State University, 1970, pp. 6-1[illegible].

SPECIFIC EXAMPLES OF VARIOUS KINDS OF WARNINGS

Air Raid

One of the best summaries of the public's response to warnings, *The Occasion Instant: The Structure of Social Response to Unanticipated Air Raid Warnings*, found that such warnings are remarkably ineffective. The study focused in on three accidental soundings of air raid warnings in three locations at the height of the cold war era.

The first accident soundings occurred in Berkeley and Oakland, California.

> On the morning of 5 May 1955, the United States Air Force was unable to identify a squadron of bombers flying over the Pacific Ocean. The bombers were headed in the general direction of the central west coast of the United States. An order was given to sound the alert warning sirens for a probable attack.
>
> Sirens sounded in Berkely and in Oakland, California. Radio stations went off the air in San Francisco. Local warnings in schools and business offices (which had internal warning systems) were sounded almost immediately after "warning yellow."
>
> It took the Air Force only a few minutes to identify the bomber squadron as an American one. All was back to normal in approximately ten minutes. In the same length of time, if the squadron had been enemy-manned and undeterred, it could have delivered a lethal blow.
>
> Oakland, California, is the focus of this study. The siren sounded there at 10:42 a.m.: five minutes of a steady blast, one minute of silence, and then five more minutes of a steady blast. The official meaning of the siren is to prepare for an enemy air attack. (The second of these five-minute blasts was cut short when the planes were recognized.) A study was undertaken to learn about the general public's response to the warning.

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[5]Mack & Baker, *The Occasion Instant: The Structure of Social Response to Unanticipated Air Raid Warnings*, National Academy of Sciences, Publ. 945, 1961, p. 9.

After the alarm, approximately 75% of the residents in the area alerted had heard it. Response to the alert took five basic forms.

The Meaning of the Oakland Signal:
First Thoughts of Respondents

First Thought	Percent of Respondents*
Air raid alert	22
Practice alert	46
Siren sounded by mistake	5
Fire, ambulance	5
Disbelief, doubt, unspecified or unsure	23

*Percent figures total greater than 100 due to a few persons expressing a "combination" of first thoughts.[6]

In attempting to explain why so few people took the signal seriously, the authors suggest that a basic concept in learning theory might apply to this interesting phenomenon.

> Several factors may have affected the public's definition of the situation. One obvious possibility is the previous exposure to many practice alerts. Oakland, unlike many other cities, had practice alerts at various times of the day, and on various days of the week. (Chicago, on the other hand, has practice alerts only at 10:30 a.m. on Tuesdays.)

[6] Ibid., p. 10.

> The application of an elementary principle of learning theory in psychology suggests one reason why less than one-fourth of those who heard the siren entertained the idea that an attack was probable. The repeated absence of reinforcement for a stimulus over time results in the extinction of any meaning for the stimulus.[7]

The study also indicated a relationship between educational achievement and heeding warnings.

> One characteristic which we do know to be related to an individual's interpretation of the signal is the amount of formal education he has. There is a peculiar curvilinear relationship between education and taking the alert seriously. The highest incidence of protective behavior was among the group who held high school diplomas but had not gone on to college. Both college-educated persons and those who were not high school graduates were less likely to try to protect themselves.[8]

Peer group reference played an important part in the response pattern as well.

> The most commonly-used technique of deciding upon and defining the meaning of the situation was first-hand observation of the behavior of others. Most of the respondents in the sample reported that they remained calm and casual because nobody around them seemed to be doing anything. It may also be of significance that of those persons who either ignored the siren or responded with casual curiousity, most were in the company of others.
>
> Finally, it seems that people are most likely to interpret the signal as a real air raid alert if they believe that war is imminent. In response to the question of whether they believed war was likely in the next two years (an whether Oakland would be under attack), more than three-fourths answered in the negative. However, those who regarded war as imminent and attack on Oakland as possible (less than 25 percent) were much more likely to define the situation as serious and the alert as real.[9]

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[7]Ibid., p. 11.

[8]Ibid., p. 11

[9]Ibid., p. 11.

The second example occurred in Washington, D.C.

The Incident

> At four-thirty in the afternoon of 25 November 1958, telephone workers in Washington, D.C., accidentally tied in the downtown Washington circuit with the Montgomery County Civil Defense System.
>
> Air raid warnings sounded immediately in several parts of Washington, in the downtown area, and inside several establishments which had internal air raid systems connected with the central warning system. Several thousand Federal government employees, among many others, were thus suddenly exposed to an unannounced and unexpected warning siren, a signal which means literally to prepare for an imminent air attack.
>
> The warning signal that sounded was the same one that had been used up to that time only for previously announced practice alerts. However, it should be kept in mind that this was an accidental sounding of the system. Consequently, there were no informed civil defense leaders on hand who knew for sure that this was not a real attack.[10]

In the follow-up study done within 30 days of the accidental alert, 1691 people were interviewed for an hour, and asked to fill out a questionnaire. The significant findings were:

- -32% wanted more information before doing anything
- -23% looked to see what others were going to do before deciding themselves
- -25% continued on as if nothing had happened
- -14% thought of going to the shelter area.[11]

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[10]Ibid., p. 17.

[11]Ibid., p. 21.

The main reason given for not responding to the warnings was that "'that signal' was only used for practice alerts." In the words of the authors, "clearly these people had been so conditioned as to render the signal used completely ineffective as a warning of a real attack." The same could be said for. . .(others). . .who stated flatly that they ignore all warning messages not previously announced."[12]

Recalling that the subject of this study were Federal employees, it is instructive to note how various groups responded.

> There were notable differences by organization in interpretation of the signal. Many employees in the Veteran's Administration apparently thought immediately of withdrawing in some way, either by going to a shelter or by leaving the building. This is a striking contrast to the Weather Bureau, where only 3 percent thought of withdrawal. State employees were also very likely to ignore the siren; more than 40 percent continued on with their jobs as though nothing had happened. HEW was the most other-directed agency; almost 30 percent first looked around to see what others were doing.[13]

It would appear that the working environment, and its unique kind of consciousness about the world one inhabits strongly influenced behavior. It would further appear that the warning recipients sought to become part of a group.

> Going to a shelter was not associated with the presence or absence of others at the time the signal sounded. Being alone at the time of the warning, however, was associated with the decision to withdraw from one's office. Interestingly enough, one was more likely to remain in one's office if he had no kin in the Washington area. Whatever the content

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[12]Ibid., p. 19.

[13]Ibid., p. 20.

of the reasoning, those who had kin in the vicinity were more likely to take protective action.

In 95 percent of the cases, some attempt was made to validate or establish the nature and purpose of the signal.[14]

The role of the social group as a frame-of-reference is underscored:

At the point during the course of the warning period, almost 60 percent of the employees in this sample withdrew from their offices. Interestingly enough, of those who did remain in their offices, 48 percent used their own group (or observation of the immediate environment) as the first source of guidance. This is to be contrasted with those who withdrew from their offices, of whom only 22 percent used their own group for guidance.

The one factor which the largest single proportion of respondents selected as most influencing their behavior upon hearing the siren was the way other people in their offices or building acted. The radio was also an important source. In the Weather Bureau, more than in any other agency, the radio proved to be the most used source of informing personnel (40 percent) that the siren did not signal a real attack. For the Commerce Department, radio was the clarifying source for only about 20 percent of the people.

Proportionately more women than men (in four of the agencies) were mostly influenced by others around them in deciding what to do about the warning signal. Proportionately more men used sources outside their offices to evaluate the situation and to decide what to do.[15]

The third study on air raid warnings found similar behavioral responses.

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[14]Ibid., p. 20.

[15]Ibid., p. 22.

The Incident

After forty futile attempts in forty successive years, the Chicago White Sox finally won an American League baseball title in 1959. The pennant was clinched when the White Sox won a night game from the Celveland Indians on September 22, 1959. The game was broadcast and telecast from Cleveland.

Just a few days earlier, the Chicago City Council had '. . .resolved that bells ring, whistles blow, bands play and general joy be unconfined when the coveted pennant has been won by the heroes of 35th Street.' The evening of the ball game, the fire commissioner (also acting director of the city's civil defense corps) decided to sound the civil defense sirens to add to the spirit of the city council's proclamation.

The baseball game ended at 9:50 p.m. Chicago time. Live telecasts and broadcasts from the dressing room of the victorious team were received for about 15 to 20 minutes immediately afterward. Then at 10:30, some forty minutes after the game had ended, the air raid alert signal went off. A steady blast for a full five minutes sounded, a signal which means that an air attack is possible but is not expected for at least 31 minutes.

Prior to his sounding of the siren, the commissioner properly notified the police and fire departments, the public utilities, and all radio and television stations and newspapers. But only a very few minutes elapsed between the arrival of this notice and the sounding of the siren. Thus, the public had no warning of the event.[16]

Two hundred-fifty people were interviewed, drawn from a geographic scattering and some attempt was made to insure a fairly representative sample.

The sample revealed the following:

Among those individuals who at one time or another believed that the siren signaled a real air alert, the most likely method of verification or validation

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[16]Ibid., p. 25.

was turning on the radio or television, or, if it was already on, paying sharper attention to it. The next most frequent action reported was looking out the window. Likewise, these are the two most frequently listed activities of verification reported by respondents who thought that the siren signaled a fire, a disaster, or a practice air raid alert. The third most important form of verification consisted of asking the opinion of someone else in the same room with the respondent.

The telephone was used as a source of verification for some 10 percent of those who thought it might be an air raid alert. Six percent of these calls went ot a public agency, and four percent went to friends and acquaintances.

As to the sequence of acts of verification, the most frequent first action consisted of either discussing the situation with someone in the immediate environment or of looking outside to see what was going on. Turning on or paying stricter attention to the radio or television closely followed the above two as a first reaction. Those who reported a sequence of three activities of verification generally went outside in stage three. The typical sequence was thus to turn to someone near you for an opinion, then to turn on the radio, then to go outside.

Only two percent of the entire sample took what might be considered protective action. Of those who thought that the siren might have signaled an air attack, six percent took protective action. Six cases are far too few to justify any meaningful cross-tabulation.

Persons were asked why they decided to do nothing. Three kinds of responses were given to this question: first, there was disbelief that it was an air raid alert; second, the respondent reported that there was no corroboration from other sources (i.e., no support from radio, people were in streets, etc.); and finally, there was the complete feeling of either futility or ignorance of what to do. These responses were divided rather evenly, approximately one-third each, although disbelief was expressed by 41 percent.[17]

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[17]Ibid., pp. 31-32.

Again, the educational factor appeared.

> As in the Oakland research, one of the more striking findings in this study is that the middle-educated group (high school graduates, but no college) tended to be the more apprehensive, and the most likely to interpret the siren as a signal for a real attack. The relationship between education and fear is here curvilinear. The groups with either high or low achievements in formal education were less likely to express fear, and less likely to interpret the siren as a signal for an air raid alert. If we compare the highly educated group with those of low formal education, there is little difference between the two groups in their response to the meaning of the signal.[18]

Attempts were made to find the commonalities in each of these three alarm response patterns, and in all three cases, it was found that belief in the imminence of war was directly associated with taking the warning seriously. Those who believed the international political situation to be tense were much more likely to interpret the situation as a warning for a real attack. This is one of the few variables which could be traced through each of the research projects, and it is therefore significant that the findings converge.

In the two studies where sex was reported as a variable (Washington and Chicago), women took the warning signal more seriously than men. Women were more likely to believe that the signal was a warning for a real attack, and they were much more likely to express fear, concern, irritation, and excitement. This seems to be especially true of women with children. Further, women were more likely to attempt to validate the

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[18]Ibid., p. 30.

siren by looking around in their immediate environment for some kind of evidence.

In both Oakland and Chicago, researchers found that the middle-educated group (high school, but no further education) was most likely to regard the siren as a warning of probable attack. If this had been a finding in only one of the studies, it would have been interesting in itself, but more easily dismissable as an anomalous finding. That the same pattern was discovered in both of the cities where education was used as a variable lends credence to the hypothesis of a curvilineal relationship between "serious concern" and "education."[19]

[19] Ibid., p. 39.

FLOODING STUDIES

In a study on flooding in Denver, Colorado, five characteristics were used to depict the unique nature of the event:

a. It was unfamiliar (less than 10% had experienced flooding in the last 30 years).

b. It was sudden—from first indication to actual water hitting town was 5 hours.

c. It was totally unexpected, as the rain which precipitated the flood did not fall on the town flooded, but fell up river.

d. It was localized—flooding confined to a skinny band along the river banks.

e. The warning contexts varied a lot. Due to the varying density of the population, some were contacted directly by police, some by relatives via phone, and some by mass media.

> When they did evacuate, families left as units. . . . About 3/4 of the families left together. . .of those families united at the time of the warning, 92% left together.[20]

> Families who received warnings from relatives very frequently evacuated their homes. . .often the warning was accompanied by an invitation to evacuate to the warner's residence.[21]

In a separate study on the same Colorado flood[22] the research conceptualized the warning process into three categories:

1. warning by authorities—(defined here to mean police and fire departments)

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[20]Drabeck, "Families in Disaster—Reaction and Relatives," In *Journal of Marriage and Family*, August 1968, p. 446.

[21]Ibid., p. 450.

[22]Thomas Drabek, "Social Process in Disaster," In *Social Problems*, Vol. 16, No. 3.

2. warning by peer—friends, neighbors, and relatives, often transmitted through the information network by the wire

3. warning by the mass media—an important variable in the efficiency of this process was that the warnings were received by several groups or family members simultaneously.

Family reactions were significantly related to the type of warning process. . . . Persons warned by authorities were much more likely to immediately evacuate or at least confirm the warning. . .seldom were such warnings discounted.[23]

Mass media warnings urging evacuation of general areas were interpreted quite differently than authorities warning evacuation of one's own home or immediate neighborhood. . . . In this respect the data clearly indicated that families urged by the police to evacuate did not have any clearer idea of the flood threat than those warned by the mass media. Hence, willingness to evacuate following police warnings appears to have been as much due to the perceived role relationship with the police as it was to specific information given. . . . Thus, while many mass media reports and peer warnings urged evacuation of specified areas, they were not interpreted in the same way as a police officer indicating that a specific house or block should be evacuated.[24]

61% of all families made some effort to confirm the warning.[25]

Four general patterns emerged:

a. appeal to authority
(9% tried to call police directly, 45% referred to the statements or authority as relayed by mass media)

b. appeal to peer
(in 43% of these cases the consulter had less information than the consultee)

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[23]Ibid., p. 342.

[24]Ibid., p. 343.

[25]Ibid.

c. observational confirmation
(watching neighbors leave, viewing the river)

> In general, the researchers found that no matter what the method used to deliver the warning, the recipient checked its validity by using one of the remaining two avenues he could have received the warning.[26]

A study of the effectiveness of the warning process attendant to floods at Marysville and Yuba City, California, in December 1955, revealed that

> In spite of intensive mass media coverage, Weather Bureau forecasts of flood danger were either ignored or actually not received by substantial portions of those interviewed in the disaster areas. Furthermore, thirty-nine percent of those who remembered receiving such reports indicated that they did not fully believe them.
>
> The investigators found the following reasons, also supported by other studies, for disbelief and reluctance to act upon flood warnings:
>
> Lack of past experience with disasters, the delusion of personal invulnerability [the feeling that 'it won't get me'], the inability to adopt a new frame of reference so as to expect unusual events, dependency upon protecting authorities, and the willingness to—seize upon reassuring communications or to deny or disregard communications predicting disaster. . . .[27]

A study done on five communities which had water related problems (either periodic flooding or pollution) showed that public "power actors" ("those individuals within

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[26]Ibid., p. 345.

[27]Richard Blum, *A Study of Public Response to Disaster Warnings*, Unpublished report, Stanford Research Institute, 1956 as quoted in *Human Beings in Disaster*, Fritz and Williams, The Annals, January 1957, p. 43.

the community leadership pool who control the resources which aide or abet attempts to solve problems")[28] tended to omit water problems from lists of local problems they were asked to cite. This was true even with "power actors" from towns experiencing damaging floods yearly! The only time "power actors" cited flooding was when it had historically effected them personally.[29] In other words, people with day-to-day responsibility for a town which had yearly flooding did not list it as a problem unless it was a problem for them.

Analysis of the data from another angle showed us when the "power actors" were asked to rank order a prepared list of 10 problems, including water. In this exercise water related problems ranked high.[30] The apparent incongruity was laid to rest by a third exercise which asked the same group to indicate the degree each of the 10 problems were subject to local remedy. In this case, a low percentage of respondents (22.5) felt that the problem had a local solution.[31]

In other words, responsible public officials in five communities seemed to ignore a major public threat unless several conditions were met: (a) it had to effect them personally, and (b) they had to feel they could do something

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[28]Water Resources Bulletin, *Factors in the Community Perception of Water Resource Problems*, Vol. 7, No. 4, August 1971, p. 644.

[29]Ibid., p. 646.

[30]Ibid., p. 647.

[31]Ibid., p. 648.

about it. Lacking either of these, no public problem solving behavior was going to be initiated.

ALCOHOL AND HEART STUDIES

Contrary to the other studies reviewed on warnings, factual data did not have a lot to do with a "warning" advertisement's effectiveness. "The five top ranking advertisements (based on an advance ranking in eight dimensions) all appeal to emotion rather than to reason."[32]

A study of 25 advertisements used as part of a campaign on highway safety involving alcohol and driving showed that:

> To attract readership, as well as fleeting attention, however, it appears that brief copy, dramatic companies, and the posing of a threat have definite benefits. To elicit action (or at least a statement of intent to act), specific recommendations seem far superior to more general ones.[33]

This particular study is very interesting because it was an attempt to alter public behavior about a danger most of the public would feel to be a random one—getting injured by a drunk driver. You will recall that earlier this paper outlined the kind of events one can be warned about: inexorable dangers (oil shortages), dangers over which one may have control (smoking), cyclical dangers (flooding) with which one may have experience, etc. This study on advertisements dealt with events over which one has no specific control, and no anticipation of. Its analog in times of crisis of a

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[32]J.W. Swinehart, *A Study of 25 Sprint Advertisements on Drinking and Driving*, NTIS Document PB-238-198, p. 10.

[33]Ibid., p. 9.

large scale might be an L.N.G. explosion, a nuclear power plant failure or a chemical accident.

The survey showed that the issuance of warnings in this case produced no significant changes regarding attitudes, or reactions to the problem, save one: the proportion of respondents agreeing with a statement "no matter how much effort is invested, there is not likely to be much effect on the drunk driver problem," rose from 39% pre-information presentation to 46% after being subjected to the warnings.[34]

In other words, repeated exposure to warnings in this particular case (and category) increased the recipients' sense of hopelessness. This tends to support the descriptions of behavior in the panic literature of trapped people who know there is nothing they can do. They become passive and hopeless.[35]

Advertisements, however, are passive agents of warning. They can only attempt to change people's behavior through verbal appeals. But even action-oriented prevention measures have not had much impact or success on their target populations.

An article in the *Readers' Digest*, quoting from the *Coronary Club Bulletin*, recounted the following:

> A serious attempt was made to rid 1817 adults of the risk factors that predispose to heart attacks—elevated cholesterol and triglyceride levels, hypertension, smoking, diabetes and obesity. An

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[34]Ibid., p. 6.

[35]Neil J., *Theory of Collective Behavior*, New York, Free Press, p. 136.

> educational program was offered to 1250 of the volunteers and the rest were allowed to follow their own ideas. Alas, after a year the prevalence of the risk factors was the same in both groups.
>
> In Canada, 230 steel workers with hypertension took part in a trial to see if compliance with regimens to control the disorder could be improved. Some were treated by their family doctors outside working hours and some by industrial physicians during work shifts. The same men were randomly chosen to receive, or not to receive, an educational program instructing them about hypertension and its treatment to prevent heart disease and stroke. Again, neither the convenience of receiving treatment at work nor the benefit of health education increased the likelihood of the men's taking the medicine.[36]

Experience and Its Role in Receiving a Warning

We have seen that small town officials react to threats when it was a matter of personal concern, and that seat belt owners tend to buckle up more if they had had friends injured in accidents. This personalization of the threat—the reverse of "it can't happen to me," seems to hold true in other kinds of warning implementations as well.

> No more than two-fifths of the residents of Lower Cameron Parish evacuated before Hurricane Audrey struck in 1957. The next year 75 percent evacuated in the pate of tropical storm Ella, even though Weather Bureau advisories did not at that time advise evacuation. When Hurricane Carla occurred in 1961, 96.6 percent of the persons interviewed had evacuated the area.
>
> Moore et al., were able to collect information in Texas and Louisiana on whether people evacuated or not and whether or not they had experienced a

[36] *The Readers' Digest*, December 1976, p. 55.

> disaster prior to Hurricane Carla. The area had had much experience with hurricanes and more specifically had been seriously affected by Hurricane Audrey in 1957. The evacuation behavior during Hurricane Carla compared with previous disaster experience indicates that previous disaster experience is associated with evacuation. It is also interesting to note that those with specific hurricane experience did not evacuate as frequently as did those with other types of disaster experience.
>
> Moore et al., were also able to test the hypothesis that those who survice earlier disasters repeat what was rewarding behavior in the previous situation. Individuals with disaster experience were asked whether they had evacuated in previous disasters. The data support this thesis.
>
> Lachman et al., found that during a tsunami which hit Hilo, Hawaii, residents with previous disaster experience evacuated more frequently. The difference, however, was as slight as 39 percent of those without previous disaster experience evacuated as compared with 48 percent with previous disaster experience.[37]

This does not, however, guarantee that previous experience with crisis will be helpful. Again referring to the Dynes summary,

> Other types of disaster experience were quite different in quality and did not seem to the people involved to be particularly relevant when dealing with the present disaster. The data indicate little relationship between the previous experiences these people had had and their reactions to this disaster. In other words, the fact that past experience with tornadoes on the part of the populace might be correlated with more adaptive behavior in future tornadoes does not imply that past experience with tornadoes would lead to more adaptive behavior in a crisis with an unlike pre-disaster warning system.[38]

Areas often hit with crisis of a similar nature tend to develop a coping behavior, called "disaster culture."

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[37] Dynes, p. 70.

[38] Ibid., pp. 70-71.

> There are two limitations to a disaster culture.[39] (1) It tends to be oriented to a specific disaster agent, and (2) it is often based on the particular model of disaster which is set on the basis of the worst disaster in recent memory.
>
> A disaster culture includes norms which indicate how the threat is to be perceived, what individual action is to take place in a specified condition, how organizational members are supposed to act, e.g., report for work immediately, etc. It includes knowledge about how warning cues are to be interpreted, the potential destructiveness of the disaster agent, and the efficiency of particular types of action. It includes a technology, such as a warning system and tools to avoid the worse consequences (i.e., hooks on the ceiling on which to hang furniture in flood conditions, taped plywood covers for windows, shelter sites picked out and stocked,etc.). Such disaster cultures emerge in communities with considerable experience in repetitive situations. They gradually learn that certain events are repetitive and perhaps even predictable. On the basis of their previous experience and preparation, such communities are able to cope with events on a routine basis that years before would have been considered disastrous. In this sense, over a period of time, a community builds its capabilities to meet the demands it has previously experienced. Evidence of disaster culture is clearly seen in certain parts of the United States, such as certain sections of Texas, Louisiana, and Florida which often experience hurricanes, and areas of the Midwest subject to tornadoes. Many communities, in such localities, 'specialize'—so to speak— in handling these frequently occurring natural disasters. Similar disaster cultures also develop in mining areas where accidents are somewhat routine.[40]

In such situations, the warning may fall on receptive ears, <u>if it fits prior experience</u>. If it does not, the existance of the disaster culture may heighten the disregarding process, due to the vested interest of the participants in holding onto their world view.

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[39]Ibid., p. 80.

[40]Ibid., p. 80.

STUDIES ON PANIC

Panic

The warning literature shows a strikingly high number of instances where public officials temporized, or delayed the issuance of a warning out of fear of causing a panic. Occasionally this fear seems to have caused the officials to couch the warning in cautious, or comforting terms. This tone is at odds with the content of the warning, and confuses the listener. In essence, the official has violated the guidelines for an effective warning: to be clear, unambiguous, and to have no disagreement about the severity of the situation.

While the literature on panic is acknowledged to be inadequate, and often lacks an empirical basis, researchers in the field do agree on the point that panic is very rare, has essential pre-conditions, and that effective warning communications are a detriment to panic—not a cure.[41]

In a survey of the literature on the problem of panic done in conjunction with flood warnings, a review of the five leading works on panic concludes "that panic is very rare, and that in the specific disaster reviewed, no evidence of it existed at all."[42]

Since the concern about panic is of obvious import to public officials, some discussion is in order. For the purpose of this discussion, panic is defined to mean behavior

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[41]E.L. Quarantelli, "A Study of Panic; Its Nature, Types, and Conditions," unpublished Master's Thesis, Dept. of Sociology, Univ. of Chicago, 1953, pp. 1-39.

[42]Drabeck, *Journal of Marriage and the Family*, August 1968, p. 446.

people undertake in an effort to preserve themselves or their loved ones, which hurts themselves or others in the process.[43]

One key to the reticence of public officials to issue straightforward warnings may lie in the following description:

> Panic, rather than being antisocial, is nonsocial behavior; ordinary social relationships are disregarded and pre-existent group action patterns fail to be applied.
>
> Thus, panic flight represents very highly individualistic behavior. It involves completely individual, as against group, action in coping with the problem of escape from a danger. In the case of panic there is no unity of action, no cooperation with others, no joint activity by the members of the mass; there is a total breakdown of corporate or concerted behavior. In short, panic flight is the very antithesis of organized group behavior.[44]

One could theorize that public officials stand to lose a great deal in a panic situation: their identity. If the social cohesion collapses, their role is lost. In other words, officials may fear using their power (to warn) for fear of losing it.

An interesting perspective that is gained is one redefined panic to mean only a mass of individuals acting individually in a time and space bound circumstance.

> If the term panic refers to the individuation of activity under stress, than according to the definition of every major theorist, panic is not collective behavior. Individuals who share a focus or a condition may act similarly, without regard for each other, and without conforming to an emergent norm. In this sense, panicky

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[43]Anselm L. Strauss, "The Literature of Panic," *Journal of Abnormal and Social Psychology*, 1944, pp. 317-328.

[44]E. L. Quarantelli, "The Nature and Conditions of Panic," *American Journal of Sociology*, November 1954, p. 268.

> behavior is simply the individual behavior of many people under stress in a small place. For each individual in such a situation other people are not persons; rather they are objects much like furniture, to be dealt with during the emergency.[45]

Implicit in this is a prescription for the avoidance of panic: that the message containing the threat also contains the guidance for appropriate behavior. Panic will not occur unless people lose their sense of membership. It would seem, then, that the phrase "we are all in this together" strives to deny a pre-condition of panic.

When contemplating the problem of panic one useful distinction for public officials to grasp is the difference between anxiety and fear.

> Fear rather than anxiety, is the effective component of the panic reaction. Along one dimension at least, fear and anxiety may be thought of as poles of continuum. This is in regard to the specificity of a threat from the viewpoint of the individual. The fear stricken individual perceives some highly ego-involved value greatly endangered. The threat is something that can be labeled, localized in space, and therefore potentially can be escaped from. The threat is specific. In contrast, there is no such recognition and judgment by the anxiety stricken person. Anxiety is marked by an inability to designate any object in the environment to account for the diffuse sense of foreboding or even dread the individual is experiencing. This inability prevents any attempts at flight, for physical withdrawal requires a sepcific object or situation from which an orientation can be taken.[46]

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[45] Michael Brown, *Collective Behavior*, Goodyear Publishing Col, Palasides, California, 1973.

[46] Riezen, *The Social Psychology of Fear;* American Journal of Sociology, 1944, and May, *The Meaning of Anxiety*, 1950, p. 271.

One situation might be created which would not fit the above description: the real or imagined dimunition of supply of a vital, or thought to be vital, commodity. A recent example of a "panic environment" would be the way in which people treated each other during the 1973 gasoline shortage, where no physical entrapment occurred. From personal observation, I (and others) can attest to the fact that fellow seakers of fuel became objectified and were "dealt with like furniture" in pursuit of the fluid. Similar accounts exist in the discriptions of the "bank panic" of 1929.

The historic view of panic tends to be that panic is irrational, based on hysterical belief, a contagion of emotion. Recent sociology challenges this description. One of the most quoted experts, Wolfenstein, has listed phenomena which occur during a panic situation:

> Intense personal terror, fear-induced behavior that is useless or destructive, unnecessary group flight from a danger felt as imminent and overwhelming; a group situation, in which others are seen as rivals or obstacles to escape; and a group situation in which people hurt or destroy others in the effort to save themselves.[47]

Other sociologists (Smelser et al.) conclude that a necessary pre-condition of panic is entrapment:

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[47]Martha Wolfenstein, *Disaster: A Psychological Essay*, Glencoe, Ill., Free Press, 1957, p. 86.

> Panic is not possible if the routes for escape are, or are conceived to be, completely open. . . nor can panic occur if the routes are conceived to be completely blocked. . .reactions such as terror or infantile regression can occur in such settings, but not panic. . .limited (and possibly closing) access to exist characterizes certain 'classic' panic situations.[48]

There are four main factors which are characteristic of the panic-producing situation.

1. Partial Entrapment

   There is one, or at best, an extremely limited number of escape routes from a situation dominated by:

2. A perceived threat

   The threat may be physical, or psychological, or a combination of both, and it is usually regarded as being so imminent that there is no time to do anything but escape.

3. Partial or complete breakdown of the escape route

   The escape route becomes blocked off, or jammed, or it is overlooked.

4. Front-to-rear communication failure

   The false assumption that the exit is still open leads people in the rear. . .to advance toward it. . . .people. . .infer the direction of escape. . . from the fact that other people are moving in a specific direction.[49]

A key ingredient to avoiding panic is preparedness by public officials concerning appropriate responses in fear-provoking situations. Failure to act in a decisive fashion may have serious implications.

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[48]Neil J. Smelser, *Theory of Collective Behavior*, New York, Free Press, 1963, pp. 136-37.

[49]Turner & Killian, *Collective Behavior*, Prentice Hall, Inc., Inglewood Cliffs, N.J., 1972, p. 84.

> Persons in panic feel powerless to bring the threat itself under control but they do not despair of getting out of danger by fleeing.
>
> Very often the feeling of personal powerlessness is greatly reinforced by social interaction. At first individuals may feel individually powerless and be greatly afraid. Yet they may expect or hope others will be able to cope with the danger. When the responses of the others, however, indicate that they, too, are powerless or have even suffered the consequences, panic becomes probable.[50]

The Proper Dosage of Fear

If one wishes to warn about a dangerous circumstance, it is important that the fear level raised in the recipient be neither too high nor too low. There exists what is called "the Proper Dosage of Fear."

> To produce successful emotional innoculation it is necessary to interfere with the person's spontaneous efforts to ward off his awareness of the signs of impending danger.[51]

Public officials reluctant to issue warnings for fear of frightening the public could draw comfort from a study of the state of preparedness of people undergoing surgery. The study indicates that three general categories of patients existed:

a. Those who were extremely anxious before and after surgery. These people felt vulnerable to body damage. Their post-surgery behavior was a

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[50]E.L. Quarantelli, Op. cit., p. 274.

[51]"When Fear is Healthy," *Psychology Today*, 1968, 1 (11), p. 48.

continuation of their general life-attitude—one of anxiety.

b. The very calm. They minimized the danger, denied the possibility of pain and suffering. Their post-surgery behavior was angry, upset, and resentful. Most of this group had been told little of what to expect, and were psychologically unprepared.

c. The moderately fearful. They solicited, and received information about what to expect. Post-surgery discomfort was no surprise.[52]

This was verified in another study, which concluded that "greater anticipatory fear is not consistently related to greater tolerance of stress. Instead, both high fear and low fear are associated with low tolerance for stress. And . . .high tolerance for stress is located in the middle of the fear continuity.[53]

A theoretical concept has evolved, called "The Work of Worrying."

> We can see more easily what the work of worrying accomplishes if we look at what is likely to happen if a person fails to undertake it.
>
> -little or no anticipatory fear
> -no mental rehearsal of impending danger
> -feelings of helplessness when the danger materializes
> -disappointment in protective authorities
> -increased expectations of vulnerability
> -intense fear and anger
>
> Failure to carry out the work of worrying can be expected if a stressful event occurs under any of the following conditions: (1) if the person is accustomed to suppressing anticipatory fear by means of denial defenses, by over-optimism, and by avoiding warnings that would stimulate the work of worrying; (2) if the stressful event is so sudden that it cannot be prepared for; and (3) if an

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[52]Irving Janes, "When Fear is Healthy," *Psychology Today*, 1968, 1 (11), p. 47.

[53]Ibid., p. 47.

> adequate prior warning is not given, or if strong but false reassurances encourage the person to believe that he is invulnerable.

Other studies on the psychological effects of severe illness, of community disasters, and of combat dangers provide many bits of evidence consistent with the findings of the surgery research described above. They suggest that if a normal person is given accurate prior warning of impending pain and discomfort, together with sufficient reassurances so that fear does not mount to a very high level, he will be less likely to develop acute emotional disturbances than a person who is not warned.[54]

A public official, then, does a greater injustice to the public by withholding information than by giving an accurate appraisal of the situation.

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[54]Ibid., p. 48.

COPING: GOOD AND BAD WARNING RECIPIENTS

In September, 1975, the American Health Foundation held a sumposium on preventive medicine.[55] Presentations reviewed the various attempts made by the medical profession to alter hazardous behavior on the part of smokers, drinkers, drivers, overweight, cancer-prone populations, and hypertension sufferers.

After reviewing the rather depressing results of many attempts to warn members of the above groups the following summary of the non-compliers (people who do not hear or act on warnings) was compiled.

1. Seat belt users are better educated, more receptive to new products, and approve of modern medicines.
2. People who have "significant others who want them to stop smoking will. This also includes parents of children who stop out of a concern for their children."
3. Having a friend injured (but not killed) in an auto accident has a beneficial effect on the use of seat belts.
4. Patients with health ailments related to smoking are better able to quit than those without. Patients with less severe medical problems are more likely to follow advice than those with more severe illness.
5. Seat belt users tend to avoid risk in other situations.[56]

It might appear that some of the factors noted in the air raid warning studies (compliance, if one had significant others), the panic literature (too serious a situation breeds

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[55]American Health Foundation, 1370 Avenue of the Americas, New York, New York 10019.

[56]"The High Cost of Self Deception, *The Journal of Preventive Medicine*, Volume 5, No. 4, December 1976, pp. 489-491.

fatalism) and in the flood literature (it is not a problem if it is not a probelm for me) appear in the above studies, also.

In the American Health Foundation Summary (referred to in the section on warning literature), the effect of one's sense of control over one's life is again apparent:

> Those smokers who were able to stop smoking had a less fatalistic attitude about life when compared to non-smokers. Smokers who try to give up the habit tend to have high aggressive needs, and low deference. Those who succeeded also have low affiliation, low change, and high achievement needs.[57]

Interestingly, it would seem that a prediliction should exist among elected policy makers, officials, etc., to heed warnings, since they would seem to fall more often into the general categories for a "good" warning recipient than the general population. It should be noted, however, that this generalization is drawn from one example (smoking) when the alternative behavior is known (not smoking) and the behavior change is within the power of the individual to accomplish.

> One study. . .done in 1953 showed that those individuals who felt unable to manage and control their own personal affairs were unable to think of several ways of meeting emergencies; they had little confidence in the likelihood of others controlling larger arrairs, had less information about national events, because, they said, there was nothing they could do in such matters. These people paid little attention to what was available in the news about threats to the society at large.[58]

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[57]Robert, "The High Cost of Self Deception," *Preventive Medicine*, Vol. 5, No. 4, December 1976, p. 489.

[58]Douvan & Withey, "The Impact of Atomic Energy of Society, *Man and Society in Disaster*, Ann Arbor, Univ. of Michigan Survey Research Center, 1953, p. 118.

> A study done in England by Fothergill and Lambeth (1950) showed that those who joined Defense as a step towards "handling" the threat of a bomb attack regarded the threat as more serious than others; at the same time they felt less impotent, and felt and evidenced effectiveness in their personal lives.[59]

As we have seen above, one of the key variables which affect whether a warning will be acted upon is whether the warning recipient feels they have control over his or her own life. This factor is followed closely by whether or not they possess the skills necessary to implement the necessary evasive action themselves.

It would seem that the self-employed, such as small businessmen, would have the needed sense of mobility to begin to respond. Likewise, policy makers, either public or private, by virtue of their greater "success" in life, should be more inclined than the average citizen to try to implement a change strategy.

However, as Kaufman and Livingston and others point out, public officials are often reluctant to propose costly evasive behavior in circumstances where the loss may be incurred during an election term, and the benefit (if any) may accrue during the next. This is because they are afraid of not getting re-elected, as they (correctly) perceive that a majority of their constituency will not value the needing of the warning—particularly if doing so costs them money.

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[59]Fothergill & Lambert, "Recruitment to the Civil Defense Services," *Man & Society in Disaster*, Nova Scotia, 1950, p. 119.

In addition to considering oneself "able" to respond to a situation, people seem more inclined to hear warnings of problems when they already know of solutions.

In 1973, while teaching in the Global Survival Program at the University of Massachusetts, I and several other faculty observed an interesting phenomenon. Many students in this program which was intended to introduce selected freshmen to the range of issues impacting upon survival, began to drop out. These students, including many of the best informed, dedicated, explained that they were overwhelmed with the complexity and hopelessness of the issues. "I just can't handle it," was the common refrain.

So serious an issue did low attendance become that the faculty of the program launched a special, informal investigation into the possible solutions. What emerged was a strong recommendation that each time a problem was framed, one or several solutions should be posed at the same time. After several false starts, this model was firmed up, and has been used successfully. It seems apparent that the teaching of future studies, ecology, bio-sciences, and other fields providing survey-depth acquaintanceship with complex problems of threatening nature must devote some considerable energy to framing <u>individually implementable</u> solutions, so as to enable the students to hear the problem at all.

A "good," or receptive, warning recipient, then, would be one who

-has a high school diploma

-has high self-esteem, achievement needs

-has had personal experience with a similar or related problem and has coped effectively in the past.

-is married or has a "family" to be responsible for

-is in their home or residence when the warning occurs

-has access to officials to verify data

-feels that ones actions can affect a situation

-has a strong sense of control over his own life

A "bad," or unreceptive warning recipient

-is either very poor or very rich, highly educated or has had little education

-never has experienced a problem similar to the one he is being warned about

-has few skills useful in this particular crisis

-has little access to authoritative sources for verification (the poor and uneducated), or if so has access to a bewildering array of opinions which contradict each other (the rich and highly educated)

-feels "nothing I do will make any difference"

-tends to be either a fearful individual in other situations or a "macho" type who ignores all warnings.

STRATEGIES FOR EFFECTIVE WARNINGS

According to Janis,[60] a useful strategy to consider when designing a warning implementation scheme would be one which forced the recipients to have to act as if the situation were real. For example: Janis took a group of female smokers, and put them through a role-playing sequence having to do with lung cancer.

> Five scenes were acted out. In one, the 'physician' pointed out the X-ray indications of a malignant mass in the patient's lung as he gave her the bad news that diagnostic tests indicated the presence of lung cancer.
>
> In the last scene, the 'cancer victim' was asked to think over the news while waiting for the physician to arrange for her hospitalization to undergo lung surgery. She was asked to express her spontaneous personal responses just as if the situation actually confronted her.
>
> Role-playing proved to be an extraordinarily disquieting experience but the subjects apparently were able to tolerate a high level of fear without mobilizing resistances.
>
> In a follow-up study conducted 18 months after the role-playing episode, the experimental subjects continued to report a significant greater decrease in the number of cigarettes smoked than did the young women in the control group. This long-term outcome indicates that a single one-hour session of emotional role-playing can have a profound long-term effect upon smokers who initially have no intention of cutting down on cigarette consumption. And the results suggest that significant changes in smoking habits may persist for years.

It must be noted that this finding contradicts the findings of the effectiveness of air-raid warnings referred to earlier, where subjects reported that a signal associated

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[60] "When Fear is Healthy," *Psychology Today*, 1 (11), 1968, p. 48.

with an air-raid drill was not a signal for an air-raid—it was a signal for a drill. However, we should also note that the nature of the problem was different—smoking is an individual decision, over which one has a certain amount of control, whereas avoiding an air-raid puts one in a very reactive position, giving those involved little time to make decisions and little control over the outcome of events.

An extremely cogent recommendation concerning ways of communicating information with high anxiety-producing content was produced for the Civil Defense effort of the 60's. Civil Defense officials suggested the use of positive incentives, when possible, such as making people aware of the damages they could possibly avoid by heeding the warning. Alternately, they suggest that negative incentives might be used effectively when the warning recipient has some familiarity with the negative outcomes.

> Learning usually is more effective when positive incentives can be used. In civil defense, we have customarily used the threat of punishment. Communications about civil defense usually emphasize the dangers of being blinded, rendered sterile, or of being obliterated. To avoid these threatened dangers, people are expected to learn complex instructions about civil defense; to invest their time, energy, and money in elaborate precautions; and to steel themselves for the holocaust. It is very difficult to teach such complex, highly-skilled responses under the threat of punishment.
>
> If threat of punishment is to be effective, the source of punishment must be localized in space and time. Spankings are effective in preventing children from playing in the street because children can see the street and they know that one step too many means quick punishment. The threat of atomic disaster is not so concrete; you

> cannot see it, have never experienced it, and, consequently, can make believe it does not exist. For punishment to be an effective aid to learning, the punishment must actually be sampled, preferably in small doses. The child will avoid the street only if he is actually punished, not merely threatened. As any parent knows, the child will not avoid the street solely because of the threat of being killed by an automobile. He has never been run over 'in small doses' and probably has never witnessed a severe accident.[61]

Their general prescription includes five suggestions:

1. Decrease emphasis on the threat.
2. Present a more consistent front among experts.
3. Communicate simple, easy-to-understand information.
4. Communicate only information which helps solve the problem.
5. If the first four suggestions are not followed, shut up, lest you make the problem worse.[62]

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[61]J.J.M.C. Nunnally, "Public Apathy Toward Civil Defense: A Case Study of Anxiety, in *Behavioral Science and Civil Defense*, National Research Council, Paper #997, p. 75.

[62]Ibid., pp. 71-77.

SUMMARY OF LITERATURE

As mentioned previously, *The Occasion Instant* (Mack & Backer), is one of the best books available on the subject of warnings. In a concluding chapter, the authors summarize much of the literature, and develop a list of significant findings. This list, reproduced here in summary form, is included for reference purposes; for those people interested in developing organizational individual/group ability to issue effective warnings. The footnotes which appear in full in the original text are omitted here to provide a simplified summary.

The authors concluded:

*People define a situation not only on the basis of objective reality of the situation, but also on the basis of their own interpretation of signals which are intended to communicate that situation.

*The interpretation placed upon a warning signal is independent of the ultimate validity of that signal.

*The interpretation of the meaning of a signal depends in part upon the observation of the behavior of others in the immediate physical environment.

*When an individual observes persons in his immediate environment acting in such a way as to indicate that they believe the signal to be valid, then the observing individual is likely to treat the signal as valid.

*When an individual observes persons in his immediate environment acting in such a way as to indicate that they believe the signal to be invalid, then the observing individual is likely to treat the signal as invalid.

*The interpretation of the meaning of a signal depends in part upon the degree of reinforcement provided by previous experience with the same signal.

*The interpretation of the meaning of a signal depends in part upon the response of official or formal sources to questions which call for validation, corroboration, or refutation.

*People evaluate current warnings in terms of past experience.

*The interpretations of the signal varies with the type of primary group within which the individual is situated at the time the signal is presented.

*People receiving warnings while in family units tend to treat them more seriously, a group of social friends, less seriously, professional peers, least seriously.

*The higher the rank of an individual within a given social category, the more likely he is to interpret as invalid a signal intended to preface a disastrous situation.

A plausible explanation of this is that persons who have achieved or enjoyed high social status are less willing to entertain the possibility that a disaster could occur which would spoil everything. It may be that persons in low-status ranks within social categories are so used to the hard knocks that they come to expect any signal as a harbinger of more bad news.

*Women are more likely to interpret the signal as valid and indicative of an impending disastrous situation than are men.

*Women are more likely to report a strong emotional response to a signal representing a potentially disastrous situation.

In addition to occupying a generally lower status, women are also covered by a norm which allows them more expression of concern and fear for the well-being of others.

*Middle-educated groups are most likely to interpret the signal to mean what it is formally intended to mean.

*Poorly educated (persons who have gone no farther than grammar school) and college-educated individuals are alike in their tendency to disregard the formal meaning of the signal.

*There is very little difference between races in the interpretation of a signal portending danger.

*Small-town residents or urbanities with small-town backgrounds are less likely to interpret a signal as valid than are residents of large cities.

*Members of "middle-status" churches are more likely to interpret as valid a signal intended to preface a disastrous occurrence.

*Generally, the older the individual the less likely is he to interpret as valid a signal intended to preface a disastrous occurrence.

*The larger and more complex the scale of the organization to which the individual belongs or with which he is associated at the time the signal is presented, the more likely is he to interpret the signal as valid.

*The more pervasive or diffuse the organization's influence upon the life of its members, the more likely is the individual member to rely upon official organizational directives in the interpretation of the meaning of the signal.

*The more highly structured and precise the organizational roles, the more likely is the individual to seek an interpretation of the signal from his nearest structural-level superior.

*An individual is likely to interpret a signal as valid to the extent that the organization of which he is a part provides training and leadership in the interpretation of signals, and drill in proper responses to them.

*An individual is more likely to interpret a warning signal as valid to the extent that he perceives his total environment as threatening or fraught with hazard.

*The behavioral response is made to the perceived situation, not to the objective reality of the situation.

*An individual is likely to interpret a warning signal as valid to the extent that he already believes the message it is intended to convey is a likely occurrence.

*Logical or rational behavior is not a necessary outcome of logical and rational interpretation.

*In the absence of compelling situational strictures, individuals behave in accordance with what they interpret or perceive the signal to mean, not in accordance with what the signal officially means.

*The behavioral response varies with the type of primary group within which the individual is situated at the time the signal is presented.

*The primary group in which the individual is most likely to take adaptive action upon interpretation of the signal is the family.

*The primary group in which the individual is least likely to take adaptive action upon interpretation of a signal intended to portend disaster is the peer group.

*The behavioral response varies with the social categories from which the recipients of a signal are drawn.

*Women are more likely than men to behave with greater emotionality at both ends of the adaptive-nonadaptive continuum. That is, women are more likely to indulge in excited maladaptive behavior, but they are also more likely to take immediate protective action when confronted with a signal of a potentially disastrous situation.

*Middle-educated groups (those who have gone to high school but no further) are most likely to take adaptive or protective action upon interpretation of a signal intended to preface a disaster.

*The behavioral response varies with the size, complexity, and pervasiveness of the organizational structure of which the recipient of the signal is a part.

*An individual will take protective action as a response to a warning signal to the extent that the organization of which he is a part provides training in the interpretation of signals and drill in proper responses to them.

ple respond to warning signals on the basis of vious experience.

eople who have survived earlier disasters repeat what was rewarding behavior in previous situations.

*People with previous disaster experience are more likely than those without it to go through organizational channels for information and verification, and more likely to obey organizational directives.

*The retrospective interpretation of the meaning of what has transpired is not based upon the objective reality of the possible or probable validity of the signal but upon the individual's interpretation of the outcome of his response to the signal.

*If the outcome is not perceived by the individual to be detrimental to his goal, his interpretation of the next similar signal will not be significantly different.

*The interpretation of a signal as a warning for a potentially disastrous occurrence does not commonly result in adaptive or protective action.

In light of the preceding analysis, it is possible to construct one set of conditions which would facilitate warning receptivity and one which would not.

"BEST CASE" DISASTER SCENARIA:
The "right" conditions for heeding warnings

The Problem

1. is highly visible
2. is destructive to property, not people
3. is easy to cope with, using commonly available skills, and tools utilized by individuals
4. threatens the entire environment which a warning recipeint occupies—home, church, work, recreation
5. has physical attributes, and effects
6. has a repetitive character, with rather long periods (months) between impacts; increases in severity with each subsequent occurrence
7. has a forewarning measured in years
8. will impact widely—at least within a bio-region, so as to cause maximum mobilization of federal resources

9. is rather predictable in impact

10. is, to a major extent, controllable.

The Warning Recipient

1. is moderately well-educated, goes to a middle status church, is in the "productive years" (25-50)

2. lives with their family (an extended family which contains women), in a large city

3. works close to home, in a large, complex organization

4. has had experience with a similar problem before, and has coped successfully, after receiving a subsequent and accurate warning from the same officials who have warned them again

5. has a world view that has room for the existence of the problem

6. have neighbors who believe the warning, and act accordingly, in public

7. receives the warning via a trusted source, while in the presence of their family

8. has an employer who has implemented previous evasive action which serves as a model and officially urges employees to do the same; the middle management verify the seriousness of the situation, beginning training programs

9. is more or less prepared by prior events for the warning.

The Officials

1. agree on the scope, nature, speed, seriousness, etc., of the problem

2. agree on coping behavior

3. coordinate their statements with each other

4. designated as public figures assume leadership role

5. have experienced something similar themselves, and handled it successfully

6. fully brief the media so verification occurs simultaneously with their warning

7. have issued warnings and coping instructions about a similar issue before, to the same population, and have credibility

8. when questioned or challenged have firm, positive, accurate responses, and don't panic or show uncertainty

9. sought, and obtained, the help of major employees in the area in establishing models of appropriate behavior and training program

10. give the public a realistic assessment of the situation and do not attempt to "hide" information or "protect" the public.

"WORST CASE" DISASTER SCENARIO:
The least conducive conditions for heeding warnings

The Problem

1. never happened before, at least not in the impacted region; no area familiarity or body of coping experience

2. has no forewarning and a very rapid speed of onset

3. is repetitive, with a short time between repeats; the worst exposure occurring first, causing no effective coping behavior; subsequent occurrences are close in time

4. has a long duration

5. effects a major geographic area, at least a bioregion, but because of its unique nature few resources exist for quick mobilization. The maximum confusion exists among overlapping political jurisdictions

7. is invisible, has maximum life hazard, low property hazard

8. is unpredictable in its range, scope, spread, speed

9. has no known means of control

10. requires skills beyond those of the average person or beyond the community's immediate resources.

The Officials

1. cannot come to any agreement among themselves about nature, size, impact and seriousness of problem and therefore issue contradictory, fragmented alerts which contain no coping instructions, or harmful ones

2. cannot agree on coping behavior

3. have no experience with the problem, or anything similar; or if they have had any previous experience, they failed at coping, and never found out why

4. failed to brief media, held them at arms' length; when questioned, appeared rattled, defensive, and uncertain

5. neglected all existing social leadership in issuing coping instructions—put an unknown in the position of authority

6. issued soothing, rather than informative, statements (particularly trusted media figures).

Warning Recipient

1. is very highly educated, or has a low educational level, attends no church, is affiliated with few social groups, and is less than 15, or older than 50

2. lives alone, or with peers, with either all women or none in unit

3. works far from place of residence, in a small organization which is unrelated to problem; employer has not taken alert seriously, and discourages employees doing so

4. has no experience with the problem, or anything resembling it

5. has a world view which has little or no room for the problem (disaster alert) in it

6. has neighbors who disregard the warning publicly

7. received the warning from a source they are suspicious of

8. has no experience-base upon which to base any coping behavior

9. is with peers when warning is received.

A SAMPLING OF STRESSFUL CIRCUMSTANCES LIKELY TO OCCUR IN AMERICA BY THE YEAR 2000

Category #1 - Resource Depletion

The United States gets 48% of all of its energy from oil, which, until 1968, was mostly pumped from domestic wells. According to the latest data, the half-way point of exhaustion of domestic supply was reached in 1971;[63] current known reserves of domestic oil will run out by 1984;[64] even allowing for ahistorically-based rate of new discoveries, total economical recoverable domestic supply will run out totally in the 1990's.[65]

United States oil consumption is rising at the rate of 6% per year.[66] Given the diminishing local supplies, importation is increasing at 30% per year. Economists indicate that the combination of increasing consumption and decreasing domestic supply call for a doubling of world tanker fleet capacity every three years.[67] Known world oil supply and historically-based discovery rates forecast the end of the world's economically recoverable oil supply by the year 2030.[68] Certain parts of the country (New England in particular) get better than 85% of their fuel from oil.[69] The midwest, which

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[63] *Science*, Vol. 184, 19 April 1974, p. 332.

[64] Ibid.

[65] Ibid.

[66] Federal Energy Administration, Press Release, Jan. 21, 1977, p. 1.

[67] *Study of Tanker Safety*, New England Regional Commission.

[68] *Scientific American*, Sept. 1971, p. 69.

[69] Mitre Corp. Report, D. Chapu, Nov. 1974, p. 8.

receives better than 65% of its energy from natural gas, has about 20 years left before its supplies are so reduced as to destroy its economy.

Nor is fuel the only strain we can anticipate in this category. Fuel production is intimately related to food production. "If the entire world were suddenly to adopt American farming and food-processing methods, increasing the diets of all four billion people to the American level, the energy consumed would exhaust the world's known petroleum reserves in 13 years," according to Dr. David Pimentel, an ecologist at Cornell University.

The only hope of being able to feed everyone adequately and to keep up with expanding human numbers," Pimentel stresses, "is to adopt food production systems unlike those of the United States. The strictest factor limiting man's ability to feed himself is the energy supply."[70]

> World food problems are continuing ones, at least until per capita production and incomes in the developing countries increase substantially from current levels. Somehow it must be recognized that long run efforts to solve such problems must be made. It should be accepted that programs and measures started now will need to continue until the end of the century. We must maintain our attention and efforts during periods of relative abundance, recognizing that unless we do, such abundance will almost certainly be followed by relative scarcity and much human suffering. But I am quite fearful that when food supplies become more plentiful, as I am confident they will in a year or so (given average weather conditions) those who now give so much emphasis to the current critical situation will turn their attention elsewhere. If this happens, tragic consequences will be inevitable.[71]

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[70] *Sciences*, Nov. w1, 1975, Dr. Pimentel.

[71] D. Gale Johnston, *World Food Problems and Prospects*, Foreign Affairs Study 20, 1974, 1150, 17th St., NW, Washington, D.C.

Dr. Lester Brown, of World Watch Institute, describes one unique aspect of the problem.

> From 1950 through 1970, the world's farmers and fishermen expanded their output more rapidly than the population grew. Between 1960 and 1972, the world expansion in grain production was particularly impressive as output per capita climbed from 583 pounds to 681 poinds. Since then it has fallen by some 35 pounds. The performance of fishermen during the same period was even more impressive; the catch weighed in at 21 million tons in 1950 and at 70 million tons in 1970. One of humanity's principal protein sources, the fish catch expanded at nearly 5% per year, raising consumption per person from 17 pounds in 1950 to 42 pounds in 1970.
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> What few realized then was that a protein-hungry world, with a population approaching 4 billion, was beginning to put unbearable pressure on some oceanic fisheries. Overfishing, depleted stocks, and declining catches followed, and the upward trend in fish protein consumption was reversed. The worldwide catch began to fall, and in 1974 it still had not returned to the 1970 peak. With population growing steadily, per capita fish consumption had declined 11% by 1974 from its 1970 peak.
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> As growth in food demand has outstripped production gains, world grain reserves have been depleted and prices have climbed. As recently as 1970, grain reserves, including both the carry-over stocks of grain and the grain equivalent of idled cropland in the United States, amounted to 89 days of world consumption. By 1974 reserves had dropped to just over 30 days, where they have since remained.[72]

On the home front, recent news reports of water shortages in California have obscured the fact that a long-term use of sub-strata water for irregation in America's west and southwest has depleted the aquafer so badly that a combination of land suburbanization, over-pumping, and

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[72]Dr. Lester Brown, *World Watch Paper 8, World Population Trends*, October 1976, pp. 15-16.

subsequent salinity encroachments are causing intense pressures on those agricultural lands—so intense is the stress that one state, California, will have to stop exporting food by mid-1980's. This will have devastating impact on that economy, and could change the face of agriculture in the rest of the 48 states.

In various states, the development of models or alternative forms of behavior is now being institutionalized, with the emergence of several agencies, such as California's Office of Appropriate Technology, and the New England Center for Alternative Technology and Food Supplies. Programs such as these are intended to insure the availability of viable alternatives to collapsing life support systems.

Category #2 - Calamities and Accidents

A relatively new hazard confronting America stems from the decline of our domestic natural gas supplies, and the concommitant substitution of liquid natural gas (LNG) by major suppliers. In this process, gas is cooled to -260° Fahrenheit when it liquifies. As a liquid it occupies only 1/600 of its former volume, and may be transported as long as the transportation vehicle can keep the gas below -260° Farenheit.

The United States is currently importing such gas at an exponential increasing rate, from overseas. Physicists calculate that a full cargo of LNG in a moderate size tanker

would kill 42,000 people if an accident occurred in Los Angeles harbor, and 84,000 people for Oxnard Hardor, California.[73]

"The United States Coast Guard estimates that two (2) LNG supertankers will visit U.S. ports every day by 1985 if the gas folks have their way."[74]

If the refrigerant system should fail, and the liquid evaporate, a plume of natural gases would erupt. If it explodes, the effects could be catastrophic. No one really knows how far a plume will continue to burn after it escapes the containment tank, and estimates range from 3 miles (Federal Power Commission) to 75 miles (U.S. Bureau of Mines).[75]

LNG storage tanks are now being built on Staten Island, about 4 miles from Manhattan proper, which will hold 38 million gallons of LNG, and stand 14 stories high.[76]

> There are 13,000 spills of oil and hazardous substances reported to the Environmental Protection Agency annually. While over 95% are fairly small, (less than 1,000 gallons), and most were of oil, a significant percentage were of toxic substances and gases fatal to any person contacting them. There are currently over 300 substances designated as hazardous by the Environmental Protection Agency.[77]

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[73]Excerpt from a report done by Science Applications, Inc., as reported in Mother Jones Press, Jan. 1977, p. 22.

[74]M.J.P., pp. 22-23.

[75]Ibid., p. 25.

[76]Ibid., p. 23.

[77]U.S. Environmental Protection Agency, *Oil Spills of Hazardous Substances*, March 1977.

> In 1976, spills and mishaps of significant danger to the public involved herbicides, chlorine gas, pesticides, PBB, PCB, metallic sodium, and arsenic, all involving circumstances requiring wholesale evacuation of the public, and serious long-term threat to the public health.[78]

Of all the petroleum-related accidents, the Argo Merchant attracted the most media attention. During the course of this accident, 7,600,000 gallons of oil were spilled into the most fertile fishing grounds in the United States, devastating the food production potential of the affected area.[79] Super tankers are now being constructed that will carry 250,000,000 gallons of oil.[80]

These vessels not only pose threats to marine life, but also may effect people on shore, as indicated by serious accidents threatening people in San Piedro, California (the Sansinena explosion in 1976), Texas City, Texas (576 people killed after chemical loading accident in 1947), 4 accidents involving bridges on the Mississippi River (the STC-100 bridge sinking in the Chesapeake Bay in 1976), and so forth.[81]

An entirely new dimension is added to the contemplation of accidents when one explores what might be classed as the "parts-per-million contaminants." Toxic chemicals so powerful that they are capable of causing damage to health (usually cancer, but often brain damage) when found in the

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[78]Ibid., pp. 26-27.

[79]Ibid., p. 21.

[80]Ibid., p. 18.

[81]Ibid., pp. 15-29 (various examples from extensive lists).

environment in quantities of 2 or 3 parts per billion (or billion, in some cases).

One example is Kepone, a persistent insectide. Careless industrial practice caused dumping of enormous quantities into rivers which feed into the Chesapeake Bay over a period spanning 1965/74, when, after repeated warnings, the Government shut down the plant. Quantities as low as 23 PPM cause cancer on test animals. The chemical is biologically concentrated in the food chain, and has a toxic-life measured in hundreds of years.[82] Some biologists estimate all fish in the Chesapeake Bay will become unfit for human consumption within several years.

A second example is the P.C.B. and P.B.B. (polychlorinated-bi-phenyls) family. Similar to D.D.T., P.C.B.'s are colorless, tasteless, highly resistant to heat. Previously used in everything from ironing board covers to plastics, carbonless carbon paper, and soaps, P.C.B.'s have now been banned under the Toxic Substances Control Act of 1970. The EPA is considering a water quality standard of 1 part per trillion due to its toxicity and ability to concentrate in the food chain. Much of the town of Bloomington, Indiana has received substantial doses (40 PPM) through sewage sludge used as fertilizer, and widespread pollution of the local rivers and streams. Sewage containing PCB's was flushed

[82] Environment Magazine, March 1977, Vol. 19, No. 2, pp. 30-34.

into the headwaters of major U.S. waterways since 1957. The entire Hudson River, for example, now has a ban on eating fish due to PCB contamination.[83]

These kinds of accidents, which have a long time between the accident and the effect, have devastating results.

> Cancer is currently the second most common cause of death in the United States. In 1974, 358,400 citizens died of cancer and about 1 million were under treatment; each year an estimated 900,000 more cases are diagnosed. The American Cancer Society estimates 25% of our population will develop some form of cancer.[84]

In 1964, the World Health Organization estimated that 75-85% of all cancers have environmental factors.[85]

Category #3:

The Failure of the Society to Provide Basic Services

One of the bulwarks of our federal welfare system is the social security system. Recent reports indicate that this system must collapse, leaving millions of aged without income. The government is now obliged to pay out 4.6 trillion dollars in benefits more than it collects from beneficiaries. Since 1973 the deficit rose from 251 billion to 4.6 trillion, and that rate of growth is expected to continue for some time.[86]

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[83]Ibid., pp. 6-15.

[84]*6th Annual Report of the Council on Environmental Quality* as quoted in *Environmental News*, June 1976, p. 1.

[85]Barbara Newman "Cancer in a Spray Can," *New Republic*, Vol. 170, May 4, 1974, p. 20, as quoted in T.G.C. Bulletin, p. 2, Vol. 8, Summer 1976.

[86]Jack Anderson's column - various newspapers - Mar. 4, 1977.

This problem is caused by two factors. First, people currently collecting social security are being supported by people currently working. In other words, the payroll deduction (F.I.C.A.) is not held in trust for the worker until retirement. It is disbursed immediately. Rather, the assumption exists that upon the workers retirement another work will take their place. Secondly, the number of people in our society of social security collecting age, or approaching it, exceeds the number of people of working age, or approaching it, to say nothing of those of working age's ability to find work. Stated another way, there will not be enough workers to continue the system the way it is currently operating.

If one couples this problem with the concommitent drain on the Federal purse caused by large unemployment rates, some inability of the Federal system to continue to honor its social contracts seems inevitable. To illustrate this, consider the following:

By examining birth data, we can estimate with fairly good certainty the number of youth entering the labor market twenty years later.

Size of Labor Force

Year	Number of births	Entry into labor force
1934	2,380,000	1955
1940	2,570,000	1960
1945	2,870,000	1965
1950	3,650,000	1970
1955	4,430,000	1975
1956	4,210,000	1976
1957	4,330,000	1977
1958	4,280,000	1978
1959	4,310,000	1979
1960	4,310,000	1980
1961	4,320,000	1981
1962	4,210,000	1982
1963	4,110,000	1983
1964	4,070,000	1984
1965	3,800,000	1985
1966	3,640,000	1986
1967	3,560,000	1987

> Simply to keep unemployment from exceeding the level of Fall 1971 (6.0 percent of the prospective labor force), the growth of the economy must proceed at such a rate that for every 3.65 young people who permanently entered the labor force in 1970, no less than 4.33 can do so by 1977! This figure assumes that there will be no change in mortality rates during the first twenty years of life—as it is reasonably safe to do—and also that there will be no change in labor requirements as a result of further automation—an assumption that is far less likely. In other words, every year for the next fourteen years, the labor force must accomodate more new entrants than were *ever before accommodated in a single year of our history.*[87]

The social implications of this are not to be taken lightly. A recent study, conducted under contract with the

[87]Kenneth Watt, *The Titanic Effect*, Sinaver Associates, 1974, pp. 102-103.

Congressional Reference Service, found that, based upon the size of the population in 1970; a one percent increase in the unemployment rate sustained over a period of six years has been associated (during the past three decades) with increases of approximately:

-36,887 total deaths (including 20,240 cardio-vascular deaths),

-920 suicides,

-648 homicides,

-495 deaths from cirrhosis of the liver

-4,227 state mental hospital admissions, and

-3,340 state prison admissions.[88]

Summary: a variety of forecastable, usually avoidable, and althogether unpleasant occurrences lies just over the horizon. For all of this, policy makers and the general public seem rather oblivious, planning institutions as if society will remain basically unchanged for millenia to come. Warning signs abound—but appear unneeded.

One can imagine a grim lottery beginning to take shape; Invest a gold coin into a pot and bet on the following questions:

a. When will the first overt U.S. invasion of an oil-supplying country occur?

b. What year will the first federal government default on social security checks occur?

c. What year and where will the first major calamity involving toxic industrial chemicals kill more than 10,000 people?

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[88]U.S. Government Printing Office, *Government and the Nation's Resources*, #052-003-00271-0.

CONCLUSIONS

From the framework provided by the two extreme cases (Best Case disaster situation, Worst Case disaster situation) it is possible to review the 3 categories of difficulties discussed in the Forecast section, and conjecture about our society's ability to respond effectively, and identify areas while futurists might want to concentrate their efforts.

The first category (resource depletion) appears to be closely congruent with a "best case" warning situation. To cite the oil shortages as only one example, as a disaster agent, it is:

1. highly visible
2. not directly destructive to people
3. easy to cope with using commonly available skills, tools, utilized by individuals (insulation, storm windows, mas transity)
4. threatens the entire environment of the warning recipient
5. has physical attributes and effects
6. has a repetitive character, of increasing severity, with rather long (annual) periods between impacts
7. has a forewarning measured in years
8. impacts a wide geographical area
9. causes maximum mobilization of federal resources
10. is rather predictable in impact
11. is to some extent controllable.

In the warning—warnee relationship thus far, in the last year we have seen fairly good agreement among experts as

to the situation, a clear chain of command emerges, agreement on coping behavior (conservation, development of coal and alternative fuels), and the education of the media. Major companies have implemented energy conservation programs. The problem is within the experience of most warning recipients since the 1973 embargo. Most warning recipients have now had experience in coping and with some inconvenience, can implement coping behavior, and are receiving information and training from a variety of sources. Their employers are implementing modes of behavior such as car-pooling. Social institutions such as churches, schools, etc. are each shouldering responsibility. The recipient is receiving the warning from familiar faces and institutions (like the local utility), many of their neighbors are believing the warning, and installing visible coping behavior symbols (wood stoves, solar collectors, insulation). Most Americans world view would seem to accept, on national security grounds is no other, the reality of the problem. A significant percentage of the impact population will, in the normal course of the dissemination process, receive the information in fertile circumstances (with family, near women, at home, etc.).

In other words, the oil resource depletion problem as illustrative of a category of problems portrayed in *Limits to Growth, the Closing Circles,* etc., are probably far from the most potentially disruptive of our society. Largely because of the long forewarning and impact time,

this category of problem, while profoundly serious, will probably not be a "disaster." It would seem that futurists who spend lots of time and energy on these kinds of problems are not focusing on the problems with the most potential for harm, but have performed a very valuable service by sounding the alert for the society, contributing significantly to the forewarning time.

Consider, on the other hand, the "worst case" category. Referring to the list of forecast problems, it would seem that catagory #2—*Calamities and Accidents*, might be nearly congruent with a worst case scenario. Contemplate a major explosion at a chemical factory, or nuclear power plant, near a major urban center, occurring on a weekday. The disaster would be unprecedented, and none of the effected would be experienced in coping. It would have no forewarning, and rapid onset. The cumulative effects (other delicate industrial process in the path might fail and explode as the supervisory personnel fled the oncoming threat) would make it repetitive, but each repitition unique. The results could conceivably last a long time. It could effect a bio-region causing jurisdictional confusion in the warning process due to its speed, but, allow little time for marshalling resources.

The toxic substance would be invisible, silent, and does not damage property. It would be unpredictable in its range, scope, spread, speed. It would have no known means of control. The local officials would have no experience

to draw on, but, since the danger would not be fully understood by the population, be heavily relied upon. They would probably not come to any agreement among themselves about coping behavior. When questioned by the media they would probably be confused, threatened, and defensive and this would be transmitted to the public. If the problem involved chemicals or radioactivity, experts from outside the community might have to be used, thereby partially negating or reducing the role of local leadership. Further, the essential conditions for panic are present. If a drifting, invisible, deadly cloud were announced to be approaching an urban area, the conditions of partial entrapment, a perceived threat, blockage of the escape route, and front to rear communication failure would all be present. This situation would have the beleagured officials in a dilemma—to warn, and possibly foster panic, or to let hysteria take over.

The hapless citizen would be in the worst possible case, a nameless, invisible threat, no solid information, confused leadership. They are away from their family, with a peer group, have no experience with the problem, and the garbled information would probably not fit into the world view. ("A cloud of poison from the XYZ plant 20 miles away—come on!). Peers would probably be disregarding the warning.

Stress to the social fabric seems the trickiest problem to anticipate, and warn about, but is probably the most fundamentary importance, while it may be enhanced by resource depletion, it may exist apart from that issue

entirely. In a time or social stress, sabatoge, social disorder, etc., may create circumstances for a Category #2 Situation—an industrial accident, for example, without the maintenance of the social fabric, the smooth exchange of goods for services, the distribution of essentials such as food and fuel, and the maintenance of commonly owned systems such as roads and utilities, cease. Without it, violence often erupts. Indeed, the outbreak of violence is often an indice of the breakdown of the social fabric. It would seem useful to attempt to anticipate points of time when the fabric might be sorely tested, and help the society cope. How does one quantify the unraveling of the fabric? Economic indicators are often used, such as the percentage of unemployed, new housing starts, rate of inflation, etc. Other indices mentioned are suicide rates, voting rates, crime rates, divorce rates, etc. Problems exist with all of these indices for a variety of reasons. Yet, nothing better exists.

It is not difficult to identify various historic social collapses which caused great hardship. The crash of '29, the race riots of the '60s, some of the anti-war movement activities—examples leap to mind. How to anticipate such circumstances? How to relate them to this warning literature?

Social collapse is often the result of loss of confidence in "the system." The dollar is perceived to be worthless, or hard work is perceived to get only more hard work—something gives.

Consider some event like a public declaration of bankruptcy of the Social Security System. Checks would either not arrive, or be worthless. This would present a case somewhere between the "best case" and "worst case" examples—the problem would be invisible, effect only a powerless minority in the society, not be destructive to property, beyond exhausting savings, little individual coping mechanisms exist. The effect would be cumulative, rather predictable in impact, and moderately controllable. The recipient most likely to heed the warning would be elderly, a high percentage women, living alone or at best with age mates, few children would be involved. They would be unemployed, and not in their "productive years," Local public officials would likely be powerless, defensive, have no direct experience with the problem, and feel it was someone else's problem.

Some informal regrouping would occur, with some elderly rejoining their children, some banding together, but in the main they would be in a terrible state.

A sense of powerlessness steals over me as I contemplate this category of problem. Essentially political in nature, both the problem and the solution require the involvement of most of the society. Unlike a nuclear disaster, or an LNG explosion, the problem would not be self limiting. Unlike resource depletion, substitutes could not be developed.

I do not know how futurists can be most helpful in this kind of problem—other than sounding the alarm.

Whose Responsibility is it to Issue Warnings?

One of the major issues I have uncovered in the preparation of this paper is the apparent lack of a warning issuing center for situations effecting large regions, political jurisdictions, etc. In the case of a fire in a theatre, or similar problem, the responsibility may be easy to allocate. For events with long forewarning and impact time, such as the fuel shortage, confusion may not matter, since many people will get in the act. For events with short forewarning times, the impact areas crossing bureaucratic, political, and jurisdictional lines, the problem is acute. Mass media, for example, which tends to be a disseminator of warnings, may be technically incapable of understanding the problem, unable to actually craft the warning, legally vulnerable for mistakes, and not politically expected to issue warnings.

> The major responsibility for issuing warning messages seldom falls to one organization. This is so in two senses. One, sometimes there may be clear-cut responsibility for the issuance of the first or even later alerts that something may be amiss, but the warning message may not clearly indicate what should be done. The course of action, in other words, is left unclear and is not the prime responsibility of any group. The weather bureau activity generally falls into this category. This agency is charged with monitoring for certain danger signs regarding the range of meteorological phenomena, anf for general notification that such signs have

> been noted. In this, its role and responsibility is clear cut. But if warning is also thought of as involving an indication of what should be done, the position is less clear. The weather bureau really has no formal responsibility on this score, and seldom, even at the local level, takes it upon itself to suggest protective or preventive actions.
>
> In a second sense, particularly with regard to non-weather kinds of threats, there is often far less clear-cut understanding of who is responsible for what, insofar as warning messages are concerned. The mass media agencies, especially radio and television stations, have generally assumed the responsibility of passing on warning messages, but they rarely initiate them. In most ambiguous non-weather cases, the local police department typically takes on a warning function. This seems to be because of all community organizations, the police are almost inevitably one of the first groups to become aware that something is amiss. But even the police seldom issue warning messages unless the impact of the disaster agent is believed rather imminent; long-range and diffuse threats are left to whatever other (usually governmental) agency is willing to take on the function.[89]

As I contemplate this, I am taken with the fact that most alerts on long-term resource shortages, and cumulative long-term disasters, seem to come from individuals and small groups funded by foundations, or not funded at all. *Silent Spring, Limits to Growth, The Closing Circle*—Amory Loving discussing nuclear power—may be some exaples. When I think about short-term catastrophics, I concur with the above quote—the existing emergency services seem to win by default, and when I think about stresses to the social fabric, a mixed group of sociologists, political scientists, economists, and science fiction writers come to mind.

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[89]*The Warning System in Disaster Situations: A Selective Analysis*, Disaster Research Center, Report #9, Ohio State Univ., Columbus, Ohio.

Specifically, based on these three scenarios, it would seem that futurists might make a useful contribution to society if; (1) some analysis of toxic substance manufacturing plants and similar installations (nuclear plants, LNG storage, etc.) around urban areas were to be made, and training sessions on cumulative nature of such calamities be considered, for public officials. Guide books containing information evacuation routes, nature of the potential, toxic substances, and areas upon designated leadership might be wirtten and issued. It is at least possible that sober contemplation of the potential problem would cause a chance in our societys, manufacture, storage, transportation, and use, of some dangerous materials.

(2) Giving the indiosyncratic nature of the work of most futurists, and the essentially "cottage industry" structure of the trade (which I think is desirable), the larger need seems to be for the institutionalization of the collection, analysis, and discrimination of forecasts pertaining to short and long-term stressing circumstances, with emphasis on social system stress, drawing heavily upon economics, sociology, and the inter-relationship between these disciplines and those studying the basic life support systems.

BIBLIOGRAPHY

This Bibliography has two parts:

1. A list of books and articles useful to anyone doing research

2. Copies of computer literature searches in Eric, Psychology Abstracts, and Sociology Abstracts.

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APPENDIX X

Disaster Studies Resource Groups

Committee on Disaster Studies
National Academy of Sciences
National Research Council
Washington, D.C.
publishes a series of monographs.

Disaster Research Center
127-129 West 10th
Columbus, Ohio 43210
Dr. Dynes publishes a journal called *Natural Hazards*.

Disaster Research Institute
London Technical Group
The Institute of Biology
41 Queens Gate
London, SW7 5HV, England
Dr. Seaman
publishes a journal called *Disasters*.

Institute for Behavioral Sciences
University of Colorado
Boulder, Colorado
Dr. Gilbert F. White